

REMARKS

The present Amendment has pending claims 1-7.

The present invention is directed to a storage subsystem and method of controlling an I/O interface having features not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, the present invention is directed to a storage subsystem having plural storage units and a storage control unit that is connected to a central processing unit and has an internal cache memory for temporarily storing data exchanged between the central processing unit and the storage unit.

According to the present invention, the storage subsystem is connected to the central processing unit by an I/O interface protocol by which the central processing unit issues I/O requests including a chain of plural commands and data to the storage control unit asynchronously with responses from the storage control unit. The storage control unit has means that decides an order of processing the plural commands and data from the central processing unit independently of the order they were received and executes the command, and the plural storage units are under control of the storage unit.

The above described features of the present invention now more clearly recited in the claims are not taught or suggested by a combination of Beardsley (U.S. Patent No. 6,105,076), Satoh (U.S. Patent No. 5,555,389) or Hathorn (U.S. Patent No. 6,349,350B1) whether taken individually or in combination with each other. Beardsley, Satoh and Hathorn were used to reject claims in the parent application Serial No. 09/911,384, filed July 25, 2001 under 35 USC §102(e) and §103(a).

Particularly, the features of the present invention are not taught or suggested by the primary reference Beardsley being that the present invention is specifically directed to a storage control unit which in and of itself decides the order process of a channel command word (CCW) chain regardless of the order of acceptance of the CCW. Thus, according to the present invention the storage control unit employs a protocol which allows for a series of plural CCW's as a CCW chain received from a host to be ordered by the storage control unit itself regardless of their order of receipt.

Thus, the present invention makes use of a communication protocol between a host and a storage control unit that is different from the communication protocol between a host and a storage control unit of Beardsley. According to the communication protocol of Beardsley a response which shows a command has been received is issued, data is transferred from the storage (or the data is stored in the storage), then status data is transferred when each CCW (command) is issued. This method is called "interlock method" (i.e., the next CCW is not processed unless the process for one CCW is completed). On the other hand, according to the communication protocol of the present invention, even if the process for one CCW is not completed, the next CCW can be accepted. Therefore, according to the present invention, the storage control unit itself decides the order of process of CCW's regardless of the order of acceptance of CCW's processes the CCW's in the decided order, and replies to the host in the decided order.

Accordingly, in the present invention, it is not necessary that the storage control unit decide the order of acceptance of CCW's, because the next CCW is not

issued by the host unless the former CCW is completed. Beardsley does not recognize nor address the problem which is resolved by the present invention. The Examiner alleges in the January 15, 2003 Office Action of the parent application Serial No. 09/911,384, filed July 25, 2001 on page 4, last line to page 4, line 4 thereof, that "said central processing unit issues I/O request consisting of a chain of plural commands and data to said storage control unit asynchronously with responses from said storage control unit is taught as the operations implemented in the host and storage controller may be executed asynchronously". However, Beardsley merely shows that a plurality of records are transferred by CCW's. The storage control unit of Beardsley simply processes the CCW's in order of receiving the CCW's contrary to the present invention. There is absolutely no teaching in Beardsley that the order of processing the CCW's can be decided by the storage control unit regardless of how they were received as in the present invention.

Thus, the features of the present invention as recited in the claims are clearly not taught or suggested by Beardsley whether taken individually or in combination with any of the other references of record. These deficiencies of Beardsley are not supplied by Satoh or Hathorn. Therefore, the combination of Beardsley, Satoh and Hathorn as suggested by the Examiner still fails to teach or suggest the features of the present invention. Accordingly, based on the above, Applicants submit that the features of the present invention as recited in the claims are not anticipated nor rendered obvious by any of the references of record whether taken individually or in combination with each other.

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Respectfully submitted,

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